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BRESEX: ON BOARD SUPERVISION: BASIC ARCHITECTURE AND PRELIMINARY ASPECTS FOR PAYLOAD AND SPACE SHUTTLE INTERFACE	11. Last page: 20
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14. Abstract/Notes

This report presents the material relative to the On Board Supervision Subsystem which was presented and considered in the joint conference between INPE and NASA personnel, held in march 12, 13 and 14 14 of 1984, in São José dos Campos, with the purpose of initiating a joint work which will lead to the implementation of the "Brazilian Remote Sensing Experiment - BRESEX. The BRESEX should consist, basically, of a Multispectral Camera for earth observation, to be tested in a future flight of the "Space Shuttle", according to a program to be executed by NASA in collaboration with INPE.

15. Remarks Trabalho apresentado ao pessoal do INPE e da NASA nos dias 12, 13 e 14 de março de 1984, em São José dos Campos, com o propósito de iniciar entendimentos conjuntos que deverão levar à implementação do "Brazilian Remote Sensing Experiment - BRESEX".

RESUMO

ESTE RELATÓRIO DOCUMENTA A PARTE DA MATÉRIA RELATIVA AO SUBSISTEMA DE SUPERVISÃO DE BORDO QUE FOI APRESENTADA E CONSIDERADA NAS CONVERSAÇÕES LEVADAS A EFEITO ENTRE O PESSOAL DO INPE E DA NASA, NOS DIAS 12, 13 E 14 DE MARÇO DE 1984, EM SÃO JOSÉ DOS CAMPOS, COM O PROPÓSITO DE INICIAR ENTENDIMENTOS CONJUNTOS QUE DEVERÃO LEVAR À IMPLEMENTAÇÃO DO "BRAZILIAN REMOTE SENSING EXPERIMENT - BRESEX". O EXPERIMENTO BRESEX DEVE CONSTAR, BASICAMENTE, DE UMA CÂMARA MULTIESPECTRAL DE OBSERVAÇÃO DA TERRA, A SER TESTADA EM UM DOS FUTUROS VÔOS DO "SPACE SHUTTLE", DE ACORDO COM PROGRAMA A SER EXECUTADO PELA NASA EM COLABORAÇÃO COM O INPE.

ACKNOWLEDGEMENTS

CONTENTS

- BRESEX ON BOARD SUPERVISION GLOSSARY -

- OBS: ON BOARD SUPERVISION
- MC: MULTISPECTRAL CAMERA
- TR: TAPE RECORDER
- SKD: SUPERVISION KEYBOARD AND DISPLAY
- TVB: TV BUFFER
- PM: POWER MODULE
- PLD.ST.:   PAYLOAD STATION
- SSP: STANDARD SWITCH PANEL
- OPDH: ORBITER PAYLOAD DATA HANDLING
- GPC: GENERAL PURPOSE COMPUTER
- MDM: MULTIPLEXER DEMULTIPLEXER
- PSP: PAYLOAD SIGNAL PROCESSOR
- MTU: MASTER TIMING UNIT
- CCTV SYSTEM: CLOSED CIRCUIT TV SYSTEM
- TC/TM: TELECOMMAND/TELEMETRY
- C/DSN: CONSOLIDATED DEEP SPACE NETWORK

- BRESEX ON BOARD SUPERVISION ARCHITECTURE -

TVB

PM

TR

MC

TIMING

OBS

PRELAUNCH TEST

PLD. ST.

SSP

SKD

OPDH
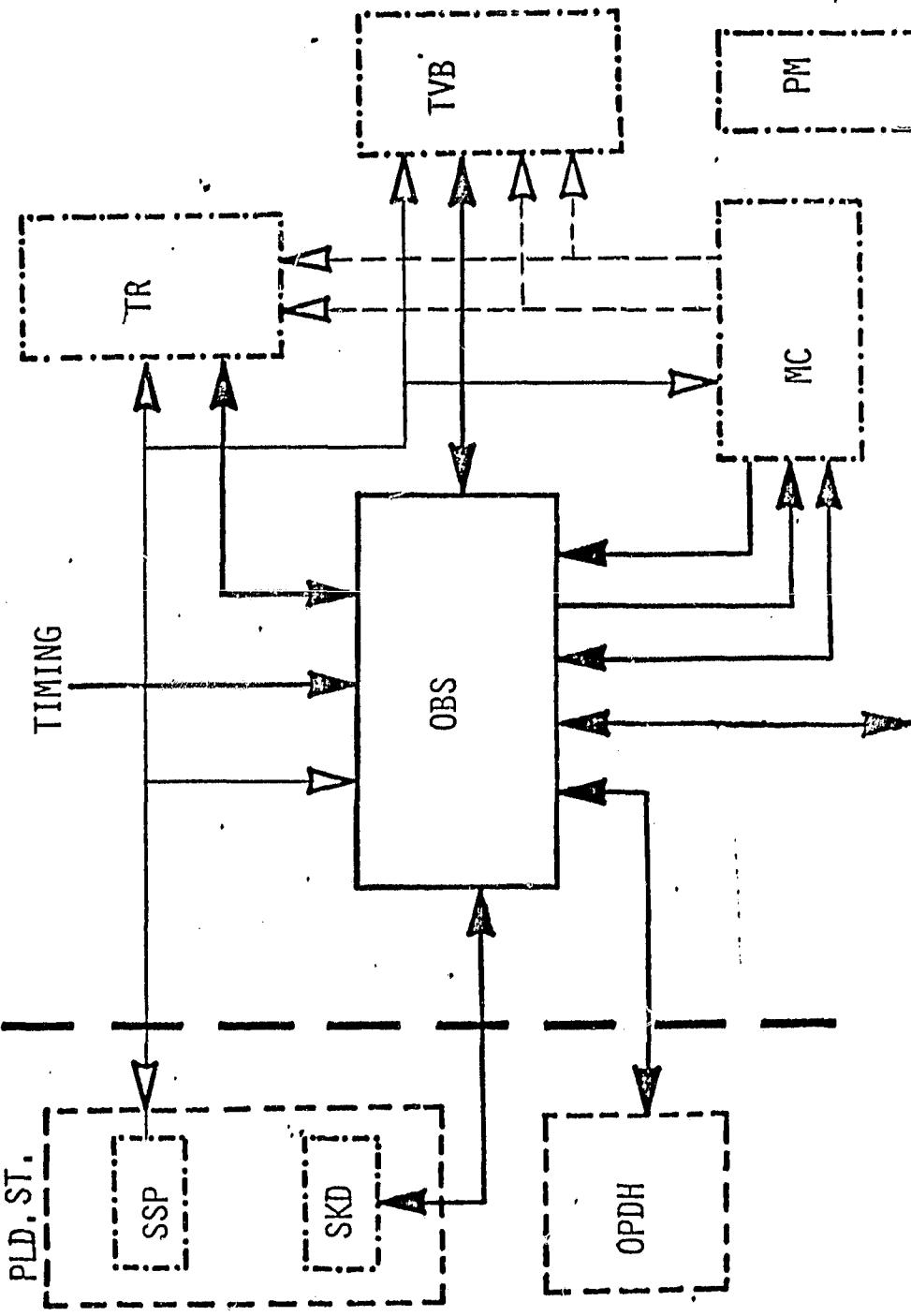
09.03.84

- BASIC FUNCTIONS OF THE OBS-MC BUSES -

. DATA ACQUISITION BUS:

SENSORS RELATED DATA (CALIBRATION, TEMPERATURE,
VIDEO SIGNAL, ETC.)

. HOUSEKEEPING DATA BUS:

MESSAGE CONTAINING ACQUISITION,
CONTROL, TESTING, ANCILLARY, TIMING,
SYNCHRONIZATION, TESTING, KEYBOARD AND OTHER
POSSIBLE SUPERVISING DATA, FOR RECORDING,
UNDER MC FRAME FORMATTING.

. CONTROL BUS:

COMMANDS AND ACQUISITION RELATED TO:
CAMERA READINESS; MIRROR POSITION NG;
CALIBRATION AND AMPLIFICATION STATUS;
SHUTTER ACTUATION;
CAMERA POWER SUPPLY, ETC.

- BRESEX ON BOARD SUPERVISION ARCHITECTURE -

TVB

PM

TR.

MC

TIMING

OBS

PLD.ST.

SSP

SKD

OPDH

PRELAUNCH TEST

DATA ACQUISITION BUS
HOUSEKEEPING DATA BUS
CONTROL BUS
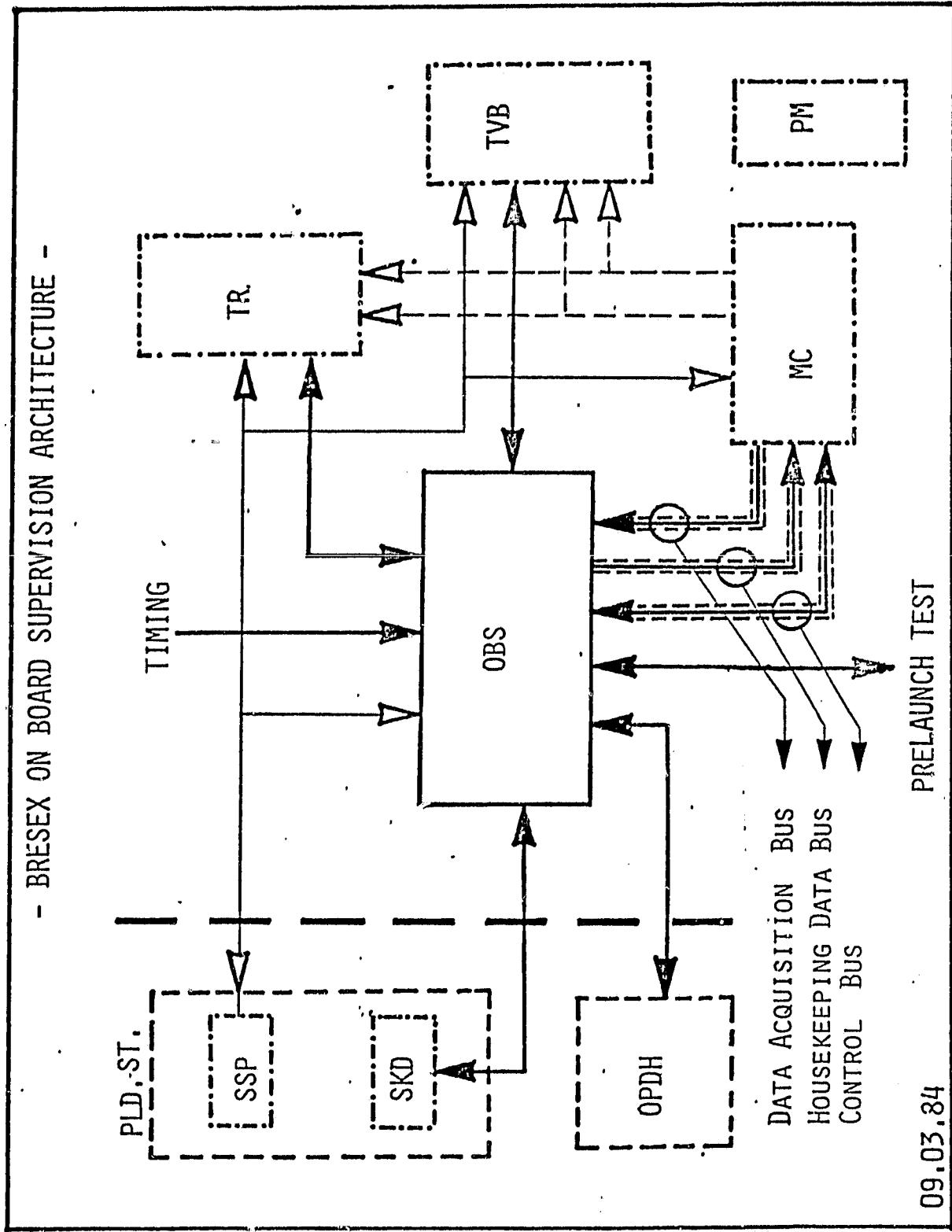
09.03.84

- <u>BASIC FUNCTIONS OF THE OBS-TR BUS</u> -

. <u>CONTROL BUS</u>:

TAPE RECORDER COMMAND AND ACQUISITION:
POWER SUPPLY, STATUS, ACTIVATION, RUN,ETC,

- BRESEX ON BOARD SUPERVISION ARCHITECTURE -
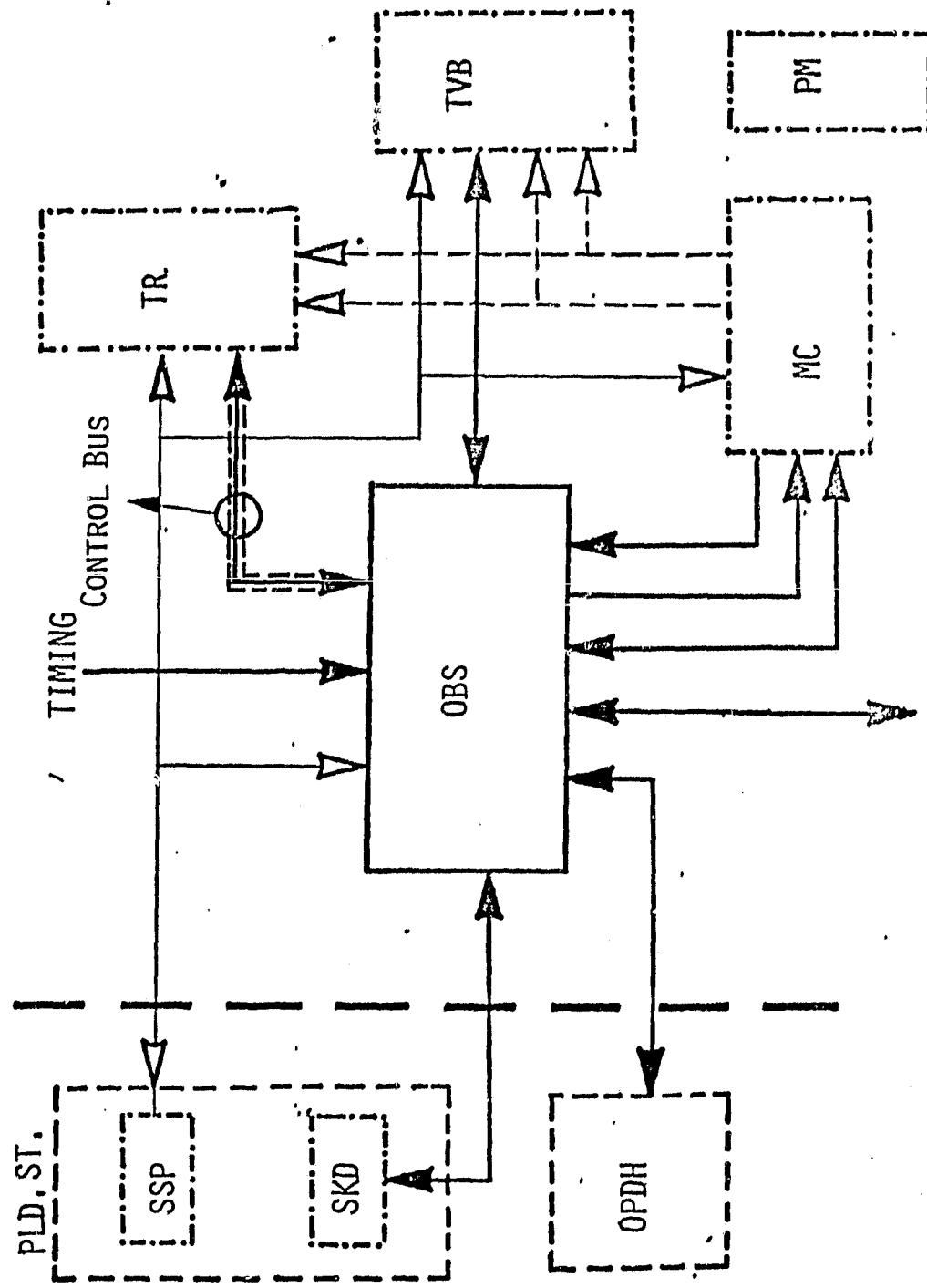
09.03.84

- <u>BASIC FUNCTIONS OF THE OBS-TVB BUS</u> -

. <u>CONTROL BUS</u>:

TV BUFFER COMMAND AND ACQUISITION:
POWER SUPPLY, STATUS, ACTIVATION, ETC.

- BRESEX ON BOARD SUPERVISION ARCHITECTURE -
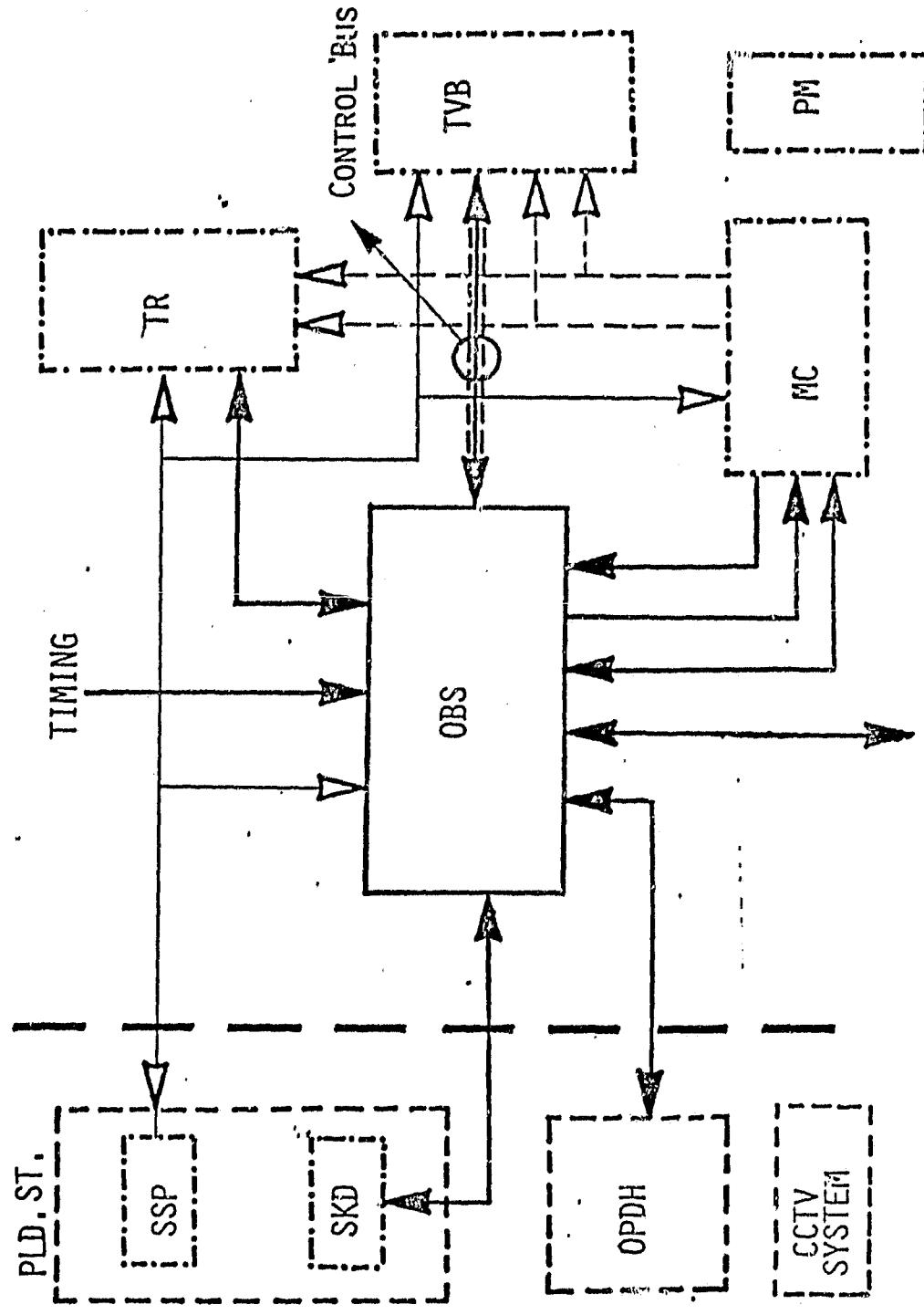
09.03.84

- BASIC FUNCTIONS OF THE TC/TM BUS -

THE TC/TM BUS IS CONSIDERED TO IMPLEMENT A DIRECT CONNECTION BETWEEN THE SUPERVISOR KEYBOARD AND DISPLAY (SKD) AND THE ON BOARD SUPERVISOR (OBS) ITSELF. THE EXCHANGE OF APPROPRIATE COMMAND AND TELEMETRY MESSAGES THROUGH THE TC/TM BUS WOULD ENABLE THE PAYLOAD SPECIALIST TO MONITOR THE OPERATION OF THE EXPERIMENT. THE SKD COULD BE IMPLEMENTED USING SOME SPECIAL INPUT/OUTPUT ELECTRONICS OR, IN A PRIMITIVE FASHION, USING THE STANDARD SWITCH PANEL (SSP) IN ITS UNIQUE VERSION, WITHOUT FURTHER SOPHISTICATION.

- BRESEX ON BOARD SUPERVISION ARCHITECTURE -
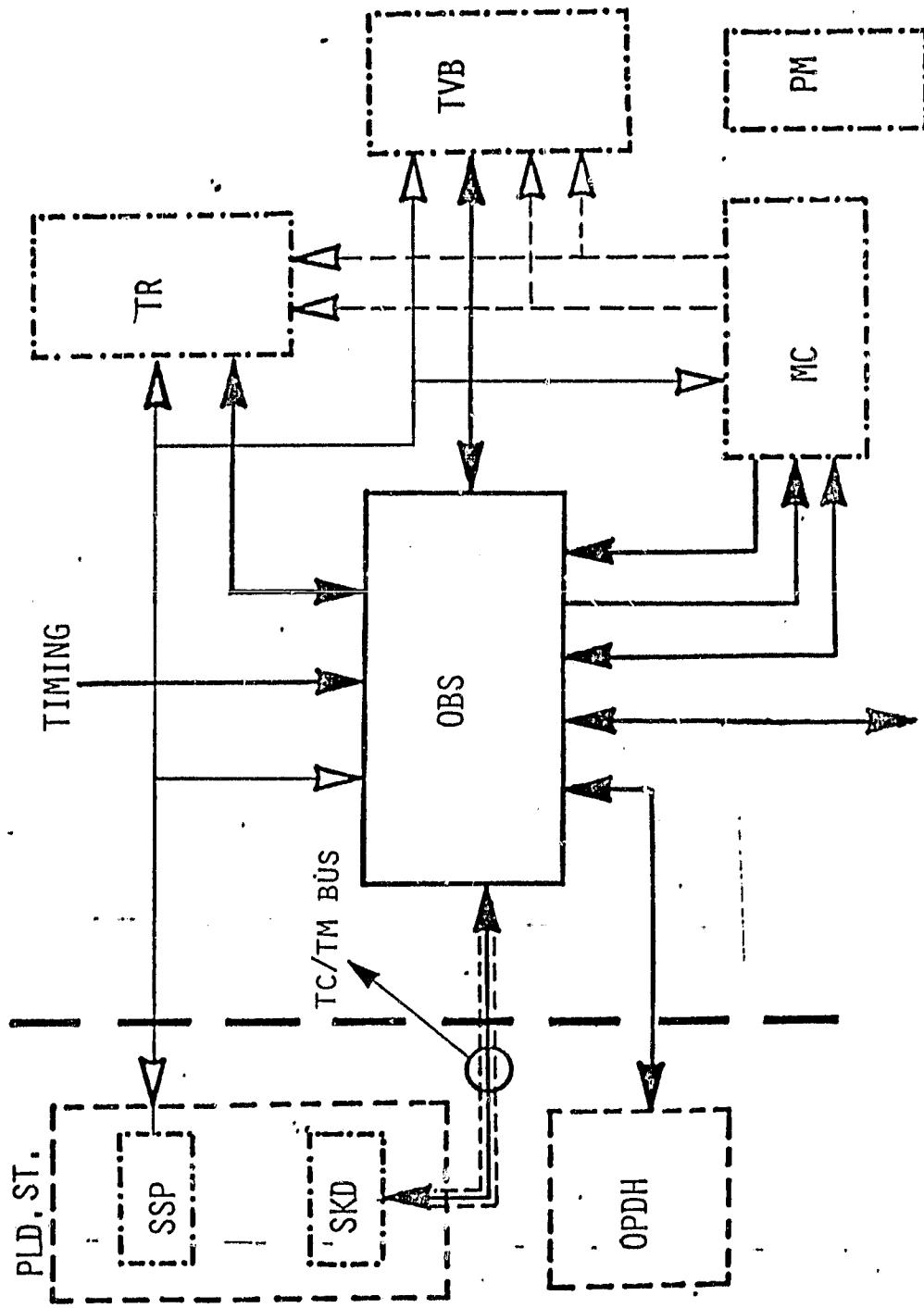
09.03.84

- SPACE SHUTTLE STANDARD SWITCH PANEL -

STANDARD SWITCH PANEL

DS19 S19 DS18 S18 DS17 S17 DS16 S16 DS15 S15 DS14 S14 DS13 S13

DS24 S24 DS23 S23 DS22 S22 DS21 S21 DS20 S20 CB4 CB3

DS7 S7 DS6 S6 DS5 S5 DS4 S4 DS3 S3 DS2 S2 DS1 S1

DS12 S.2 DS11 S11 DS10 S10 DS9 S9 DS8 S8 CB2 CB1

J14 (NBCE8-9BSN) ①

J15

AUX 1/0

NOTES:

① CONFORMS TO NASA SPECIFICATION 40M39569
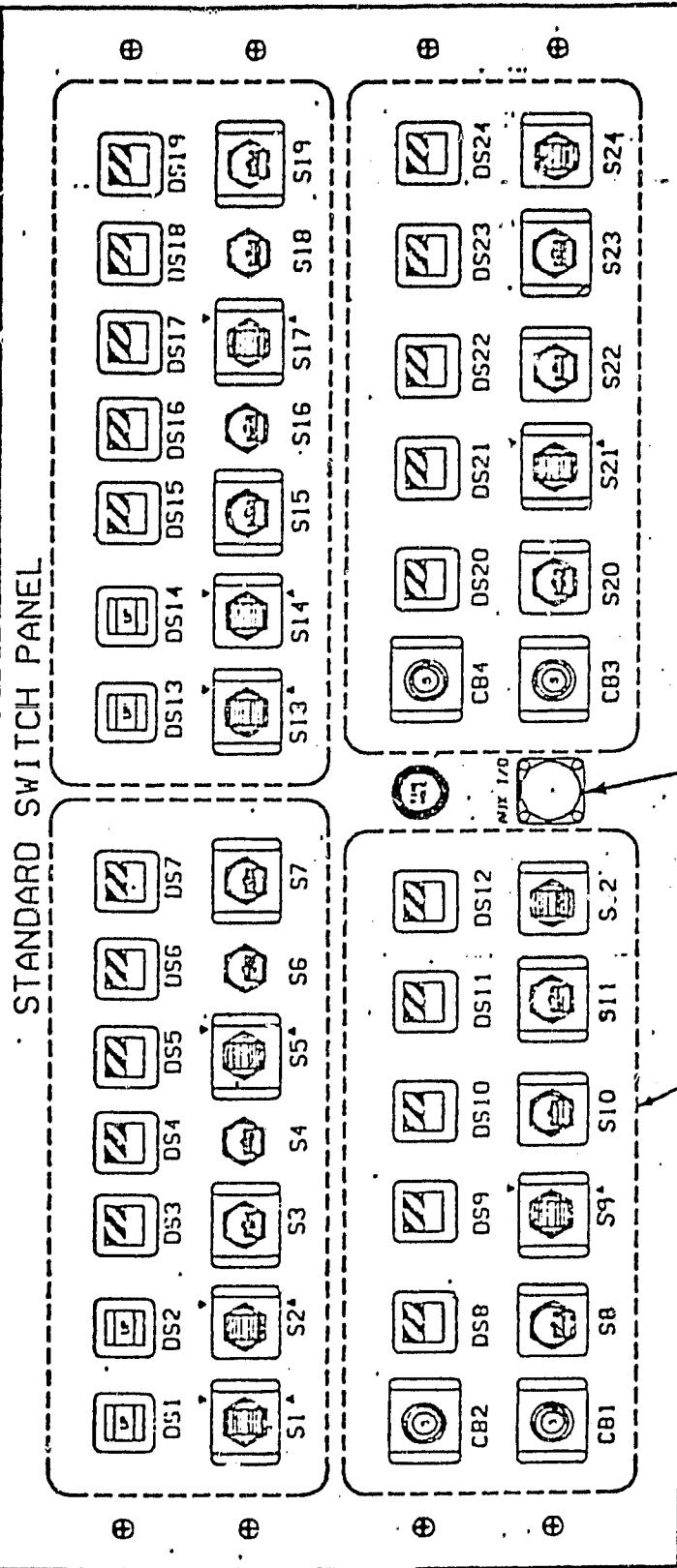
2. PANEL IS PANEL SIZE E AS DEFINED IN PARAGRAPH 3.4.1.1.1

MARKING OF FOUR OVERLAYS TO BE DONE BY JSC PER INDIVIDUAL CARGO ELEMENT REQUIREMENTS (OVERLAY WILL COVER COMPONENT DESIGNATORS)

- SPACE SHUTTLE AFT FLIGHT DECK PAYLOAD AVIONICS -

Aft viewing windows

Payload operations displays and controls

Payload handling controls

Rendezvous and docking controls

Payload operations panels to be supplied by NASA

Flight deck stowage

Hand controllers

Mission operations displays and controls

ON-ORBIT STATION (REF PARA 3.4.1.3)

PAYLOAD DEDICATED PANEL AREA
AREA EQUALS 3.68 FT^2
VOLUME EQUALS 2.13 FT^3

PAYLOAD
STATION (REF
PARA 3.4.1.4)

PAYLOAD DEDICATED VOLUME BELOW
PAYLOAD STATION EQUALS 1.3 FT^3

PAYLOAD DEDICATED
VOLUME EQUALS 1.3 FT^3

MISSION
STATION
(REF PARA
3.4.1.2)

REMOVABLE
CONSOLES: PAYLOAD DEDICATED
VOLUME EQUALS 17.24 FT^3
(REF PARA 3.4.1.1.1)

A6-A2 A7-A2

C CCTV

STOWAGE AREA

L12 L11 L10

L15 L14 L13

R7

R12

R11 R14

VIEW LOOKING AFT

NOTES:

1. LEGEND

▒▒ PAYLOAD DEDICATED PANEL AREA EQUALS 16.85 FT2. PANELS ARE DEFINED IN FIGURE 3.4.1.1.1-1.

▓▓ ADDITIONAL PAYLOAD DEDICATED D&C PANELS ON INBOARD SURFACES OF THREE EQUIPMENT
CONSOLES REQUIRE ALLOWANCE OF SIX (6) INCHES DEPTH OF NORMAL PANEL AREA. ALL COMPONENTS ON
THESE SURFACES MUST BE FULLY RECESSED. ADDITIONAL PANEL SURFACE AREA IS 5.5 FT2

2. TOTAL PAYLOAD DEDICATED VOLUME IS 21.64 FT3

Figure 3.2.1.1(A) Shuttle Orbiter Payload Physical Interface
Locations – Aft Flight Deck General Arrangement

-· BASIC FUNCTION OF THE DATA HANDLING BUS -

FOUR POSSIBLE CONNECTIONS BETWEEN OPDH AND OBS:

1. GPC - OBS:

    - SPECIAL INTERFACE IS NEEDED;
    - RELATIVELY HIGH (1 MBITS/SEC) DATA RATE;
    - ANCILLARY, TIME, COMMAND AND TELEMETRY DATA CAN BE EXCHANGED, ALTHOUGH THROUGH A POLLED LINE.

2. MDM - OBS:

    - POINT-TO-POINT SERIAL COMMUNICATION;
    - APPARENTLY NO SPECIAL INTERFACING ELECTRONICS IS NEEDED;
    - COMMAND DATA;
   - RELATIVELY HIGH DATA RATE (1 MBITS/SEC).

3. PSP - OBS:

    - LOW SPEED DATA RATE;
    - PARALLEL LINES;
    - COMMANDS ONLY

4. MTU - OBS:

    - MASTER TIMING.

- BRESEX ON BOARD SUPERVISION ARCHITECTURE -

TVB

PM

TR

MC

OBS

TIMING

PRELAUNCH TEST

DATA HANDLING BUS

PLD.ST.

SSP

SKD

OPDH
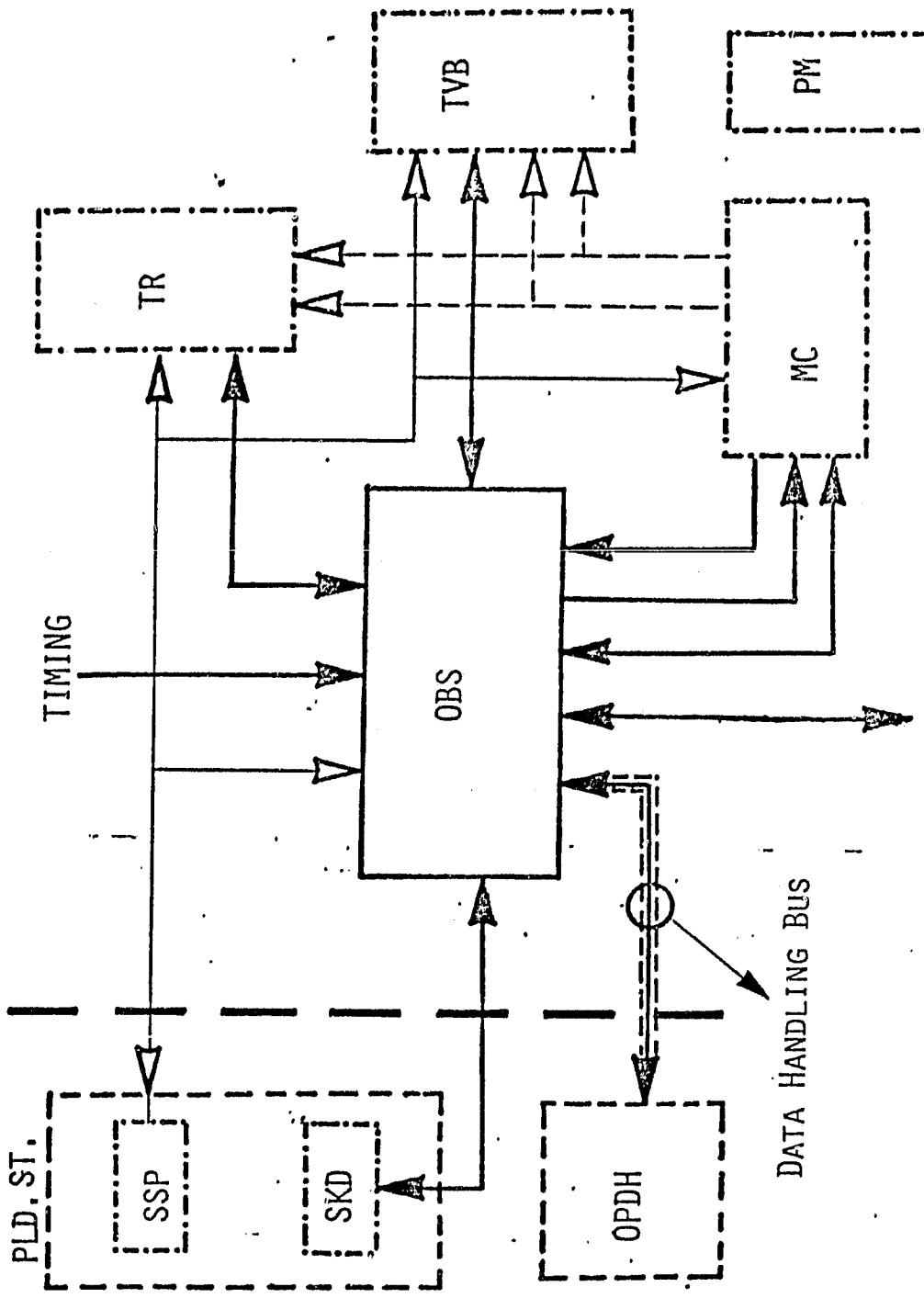
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- BASIC FUNCTIONS OF THE STANDARD COMMAND BUS -

THE STANDARD COMMAND BUS IS INTENDED FOR MANUAL USE, NOT ONLY FOR SOME RENDUNDANT FUNCTIONS, NORMALLY EXECUTED BY THE ON BOARD SUPERVISION SUBSYSTEMS, BUT FOR SUBSTITUTING IT, IN CASE OF FAILURE, WHILE PRESENVING THE ESSENTIAL OPERATION OF THE OTHER SUBSYSTEMS OF THE EXPERIMENT.

- BRESEX ON BOARD SUPERVISION ARCHITECTURE -

09.03.84
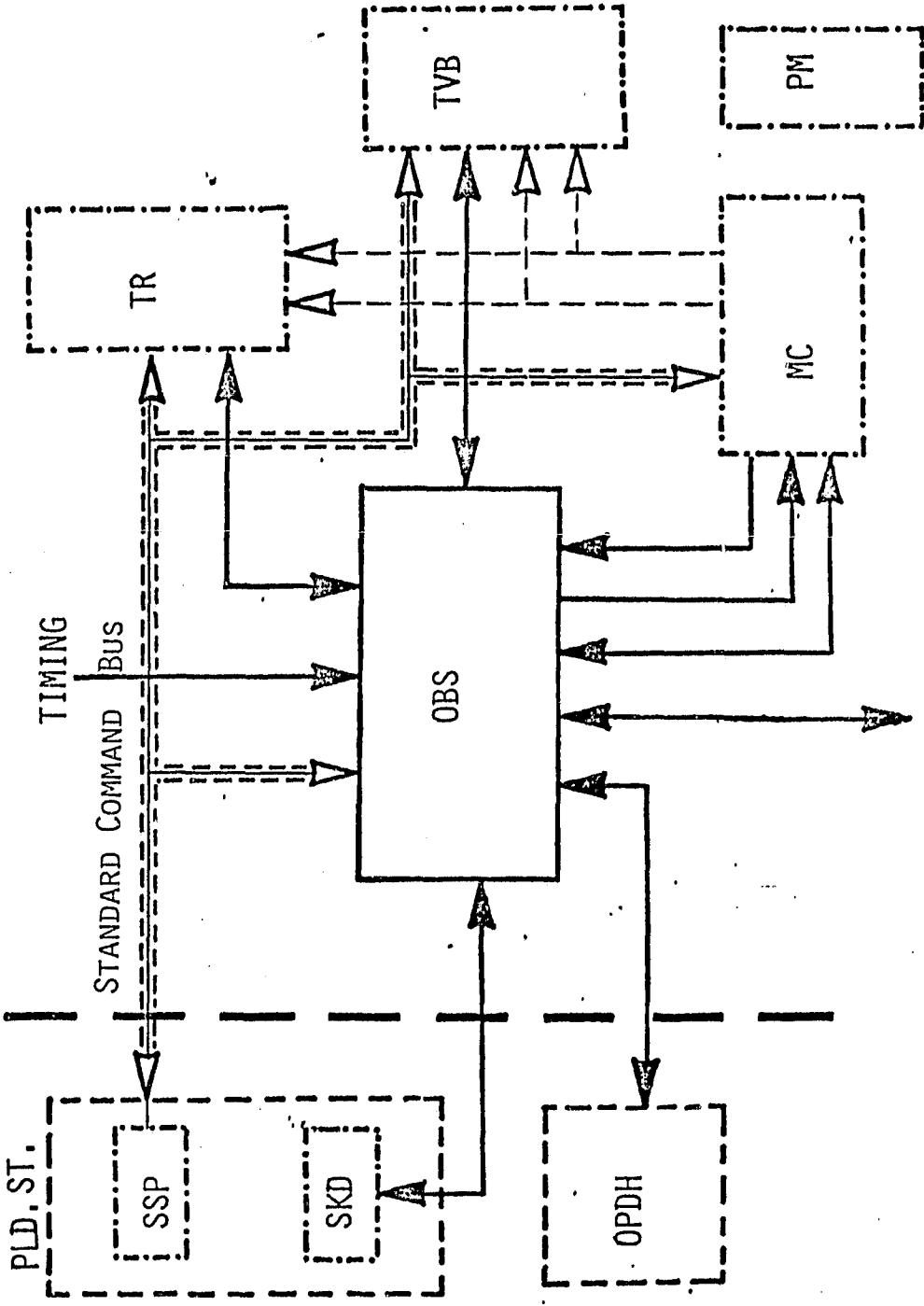
- <u>SOME VERY BASIC QUESTIONS TO BE TREATED</u> -

1. DETAILED DOCUMENTATION (HARDWARE AND SOFTWARE) ON
   THE FOUR OPDH - OBS POSSIBLE CONNECTIONS FOR
   BETTER UNDERSTANDING OF THE ALTERNATIVES FOR
   INTERFACING THROUGH THESE BUSES;

2. DETAILED DOCUMENTATION ON THE SSP AND PAYLOAD
   STATION ELECTRONIC HARDWARE;

3. NASA EVALUATION AND COUNSELING ON THE ALTERNATIVES
   FOR INTERFACING THE ON BOARD SUPERVISOR WITH THE
   SPACE SHUTTLE AVIONICS;

4. NEED TO GET KNOWLEDGE ON QUALIFICATION CONSTRAINTS
   OF THE PAYLOAD FOR MISSION APPROVAL.

5. POSSIBLE MEANS OF ON BOARD AND GROUND MESSAGE
   EXCHANGE IN VIEW OF THE DESIRED FUTURE CONNECTION
   BETWEEN INPE SPACE DATA NETWORK AND THE C/DSN
   FOR CROSS-SUPPORTED SPACE MISSIONS.